A. Title: Application for Permit for Scientific Purposes under the Endangered Species Act of1973.

Project Name: Lamprey and juvenile salmonid collecting in Cedar Creek, a Tributary to the Lewis River, Clark County, Washington.

B. Species: Chinook Salmon
Lower Columbia River Chinook ESU
Chum Salmon
Columbia River Chum ESU
Coho Salmon
Lower Columbia River Coho ESU
Steelhead
Lower Columbia River Steelhead DPS

C. Date of Permit Application: May 30, 2008

D. Applicant Identity:

Applicant: Howard Schaller, Project Leader
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E. Information on Personnel, Cooperators, and Sponsors:

1. Principal Investigator:
Timothy Whitesel, Team Leader
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2. Field Personnel:
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Sheila Davis
Sara Ennis
Sam Lohr
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Greg Silver

3. Sponsors:
U.S. Fish and Wildlife Service

Cooperating Institutions:
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4. Contractor:
None

5. Disposition of tissue samples, dead specimens, or other remains:
We will not retain carcasses or tissue from any listed salmonids that may die as a result of our sampling activities. All carcasses will be returned to their capture site.

6. Transport and long-term holding of listed species:

No listed species will be transported or held for the activities listed in this permit application.

F. Project Description, Purpose, and Significance:

Three lamprey species occur in the Columbia River basin. Pacific lamprey *(Lampetra tridentata)* have declined to only a remnant of their abundance prior to the 1940s (Close et al. 1995). The status of western brook lamprey *(L. richardsoni)* and river lamprey *(L. ayresi)* is unknown. Identifying the biological factors that are limiting lampreys in the Columbia River basin is critical for their restoration and management. A petition to list Pacific, river, western brook, and Kern Brook *(L. hubbsi)* lampreys under the Endangered Species Act was submitted to the U.S. Fish and Wildlife Service in 2003. A 90-Day Finding (69 FR 77158) determined that listing the species was not warranted at the time. Natural resource agencies and other entities are increasingly concerned about the biology, management, and information needs for lamprey. The Columbia River Basin Lamprey Technical Workgroup, a subcommittee of the Columbia Basin Fish and Wildlife Authority (CBFWA), identified critical uncertainties for lampreys and strategies to address them (CBFWA 2005).

Since 2000, the U.S. Fish and Wildlife Service's Columbia River Fisheries Program Office (CRFPO) has been collecting quantitative baseline data for Pacific lamprey and western brook lamprey in Cedar Creek, a third-order tributary to the Lewis River in Washington.

1. Justification of the objectives: The purpose of this project is to address a variety of objectives to assist in alleviating critical uncertainties for Pacific lamprey and western brook lamprey. Primary objectives for the multi-year work in Cedar Creek include: 1) Estimate abundance, measure biological characteristics, and determine migration timing of adult Pacific lamprey; 2) Evaluate spawning habitat requirements of adult lamprey; 3) Determine outmigration timing and estimate the abundance of recently metamorphosed lamprey (macropthalmia) and ammocoetes; and 4) Determine larval lamprey distribution, habitat use, and biological characteristics (see Stone et al. 2001, 2002; Pirtle et al. 2003; Le et al. 2004; Luzier and Silver 2005; Luzier et al. 2006). Addressing the four primary objectives of the multi-year project has provided additional opportunities to conduct work on such studies as: 1) Evaluation of larval lamprey capture efficiency with backpack electrofishing using a field experiment approach; 2) Efficacy of marking larval lamprey with colored elastomers; 3) Physical characteristic associated with predicting metamorphosis of larval lamprey; and 4) Identification of genetic markers in Pacific and western brook lamprey by providing tissue samples. Data generated from addressing these objectives are improving our understanding of life history events, habitat relations, and their variability for both species of lamprey in Cedar Creek, which contributes to assessing their status and developing conservation strategies (i.e., critical uncertainties concerned with lamprey status, biology/ecology, population dynamics, limiting factors, and restoration activities (CBFWA 2005)).

2. Federal agency relations: In the 90-Finding (69 FR 77158), the U.S. Fish and Wildlife Service encouraged additional information gathering and research to increase understanding of lamprey status and conservation, and specifically noted the topics of biology, ecology, distribution, abundance, trends in abundance, habitat needs, and population structure. These topics largely correspond to the critical uncertainties identified by the Columbia River Basin Lamprey Technical Workgroup, which is composed of representatives from state and federal agencies, tribes, and other entities.

The multi-year project has primarily been funded by the Bonneville Power Administration (BPA), and to a lesser extent, the CRFPO. Funding from BPA will end after FY08, however, we intend to continue some level of work with lamprey in Cedar Creek concordant with available funding from the CRFPO and other potential sources.

3. Broader significance of project: This project contributes to addressing critical uncertainties regarding lamprey whose scope includes the entire Columbia River basin. Similar uncertainties exist throughout the range of lamprey distribution.

4. Relationship to other projects: Activities for some primary objectives of the multi-year project (e.g., operation of a rotary screw trap to capture both larval lamprey and juvenile salmonids) have been coordinated and shared with the Washington Department of Fish and Wildlife. Opportunities to continue such activities will be dependent on future study plans and schedules of each agency.

5. Justification for using listed species:
Although the objectives of this project do not include listed species (i.e., salmonids), they are likely to be encountered when sampling for lamprey in Cedar Creek. When listed salmonids are collected, we will enumerate them by species and immediately release them with as little handling as possible.

G. Project Methodology:

1. Proposed project duration: We anticipate beginning field activities on the project during January 2009, and continue for five years (December 2014). We may use various traps to collect both adult and juvenile lamprey during any month of the year that flow conditions are conducive to trapping. Spawning ground surveys may be conducted during April through August, whereas backpack electrofishing may be used during the months of relatively low flow (e.g., May-September).

2. Procedures and techniques: Adult Pacific lamprey will be collected using pot traps, which consist of 30-cm diameter PVC pipe with funnels on each end. Traps will be placed at various locations in Cedar Creek and inspected for captured fish daily. Our experience has been that juvenile salmonids are rarely susceptible to capture by pot traps. Any listed salmonids encountered will be promptly released at the capture site and subjected to minimal handling to enumerate each species. In addition, spawning ground surveys will consist of identifying lamprey nests during the spawning period (April-

August) by conducting foot surveys in select reaches at either monthly or weekly intervals.

Juvenile lamprey will be captured using a floating rotary screw trap (constructed by E. G. Solutions, Inc., Corvallis, OR) with a five-foot diameter cone. When operating the trap will be checked daily to remove captured fish and debris from the livebox. Captured salmonids will be removed from the trap livebox and held in buckets of aerated water for no more than 15-30 minutes. All individuals will be enumerated by species and recorded, any mortalities noted. All juvenile salmonids, including carcasses, will be released 50 m downstream of the trap. Although the trap site has been at the Grist Mill in Cedar Creek, we intend to assess alternate sites for operating the trap. We also intend to evaluate the efficacy of other trap types (e.g., inclined-plane trap) for collecting juvenile lamprey. All other trap designs will have a livebox similar to that on the rotary screw trap, and we would treat all captured salmonids in the same manner as those collected in the screw trap.

The spatial distribution and habitat association of larval lampreys in Cedar Creek will be assessed using a stratified systematic point-sampling technique, wherein transects will be established in sample reaches on will 1-m^2 sample points will be located. Specific habitat characteristics will be measured at each sample point, and the density of larval lampreys estimated using a backpack electrofishing unit. An AbP-2 backpack electrofisher (Engineering Technical Services, University of Wisconsin, Madison, Wisconsin) will be used. The electrofisher settings will deliver 3 pulses/second (125 volts DC) at 25% duty cycle, with a 3:1 burst pulse train (three pulses on, one pulse off) to remove larvae from the substrate (Weisser and Klar 1990). Once larvae emerge, 30 pulses/second will be applied to stun the larvae. Each sample point will be sampled for 90 seconds per pass, with a minimum of two and a maximum of five passes. These electrofisher settings are well below the maxima recommended in the NMFS (2000) backpack electrofishing guidelines. We will not exceed these settings and follow all other recommendations in the guidelines. We will discontinue sampling at a point if a juvenile salmonid is encountered in the electric field. We will also use electrofishing at the same settings to collect juvenile lampreys from pools and backwater areas for use in a variety of field and laboratory tests, including an evaluation of electrofishing efficiency using juvenile lamprey planted in 1-m^2 stream enclosures.

a. **Methods of capture and of release:**: Methods of capture include backpack electrofishing, pot trap, rotary screw trap, and other types of traps (e.g., inclined-plane trap may be evaluated). All juvenile salmonids will be released at the site of capture or a short distance downstream of traps.
b. **Sampling schedule and locations:** Traps may be operated throughout the year when flow conditions are conducive, whereas electrofishing will be used during summer through fall months when stream flows are relatively low. Sampling activities may be conducted throughout the Cedar Creek drainage (a tributary to the Lewis River, 4th field HUC 17080002) where permission for access on private property has been granted.

c. **Description of tagging:** Tags will not be used on listed salmonids for this project.
d. **Description of drugs:** Lamprey may be anesthetized with a 5-25 mg/L buffered solution of MS-222, whereas listed salmonids will not be anesthetized.
e. **Temporary holding time prior to release**: Listed salmonids will reside in liveboxes on traps no more than 24 hours. They will be held in buckets of fresh aerated water for no more than 15-30 minutes while they are being enumerated by species. They will not be transported to another site.
f. **Number and types of samples taken from each individual**: No tissue or other samples will be taken from listed salmonids.

3. Possible alternatives to using the proposed methods: Listed salmonids have rarely been encountered when sampling lampreys using pot traps and electrofishing during our studies that began in 2000. However, substantial numbers of juvenile salmonids, as well as occasional post-spawning adult coho salmon, are captured with the rotary screw trap. We check and clean the trap daily so that we can immediately adjust operations in response to stream conditions and abundance of listed salmonids.

4. Potential injury and mortality: The primary cause of injury and mortality of listed salmonids in the rotary screw trap is high loads of debris and presence of relatively large fish (e.g., cutthroat trout). We will place cement blocks in the livebox to provide salmonids refuge from debris and other fish, and thoroughly clean debris from the livebox daily.

H. Description and Estimates of Take:

See Table 1 (attached).

1. Recent status and trends: Washington Department of Fish and Wildlife (WDFW) has estimated smolt abundance, primarily for naturally produced coho salmon and steelhead, in Cedar Creek using a rotary screw trap at the Grist Mill site (Seiler et al. 2002, 2004; Volkardt et al. 2005, 2006). During 2001-2005, range in point estimates of abundance was 24,138-58,921 for coho salmon and 1,727-3,565 for steelhead. In addition, estimates were made for coho salmon derived from remote site incubators and hatchery plants for 2003-2005, which were 8,476-17,650 individuals. Estimates were not calculated for Chinook salmon, however, 361-49,564 fry were captured in the trap during 2001-2005.

2. Potential mortalities by take category: All take of listed species would be from capture, handle, and release activities. These would occur as a result of our actions focused on lampreys. Based on our pervious experience with working on lampreys in Cedar Creek, we do not anticipate mortalities of listed species to exceed 1%, all of which would be indirect mortality.

3. Take estimates: Estimates of take are identical to those in Permit 1487, which expires on December 31, 2008. These were based on observations made from the rotary screw trap results at the Grist Mill site during pervious years and anticipated additional juvenile salmonids that could be encountered between the trap site and mouth of Cedar Creek. Since Permit 1487 was issued, a number of hatchery stocks in the Lewis River basin have been listed (i.e., Lewis River spring Chinook program, Fish First spring Chinook program; Lewis River Type-N coho program, Lewis River Type-S coho program, Fish First wild coho program, and Fish First Type-N coho program). Based on abundance estimates of coho salmon WDFW calculated for 2003-2005, hatchery-derived fish made up 13-34% of all coho salmon. We are likely to encounter hatchery-derived coho salmon during our project in Cedar Creek. Therefore, we assumed that 25% of all coho salmon captured are produced by the listed hatchery programs.

4. USFWS species affected: Bull trout are listed as threatened by the USFWS, and are present in the Lewis River basin. However, they have never been documented in the Cedar Creek watershed. Thus, our activities are not expected to affect bull trout.

I. Transportation and Holding: Not applicable.

J. Cooperative Breeding Program: The CRFPO is willing to participate in a cooperative breeding program and maintain or contribute data to a breeding program if requested.

K. Previous or Concurrent Activities Involving Listed Species:

1. Previous Permits: Permit 1338 authorized take of CR chum salmon, LCR steelhead, LCR Chinook salmon, LCR coho salmon; Permit 1421 authorized take of SR sockeye salmon, UCR spring Chinook salmon, UCR steelhead, SR fall Chinook salmon, SR spring/summer Chinook salmon, SR steelhead, MCR steelhead, LCR Chinook salmon, LCR steelhead, CR chum salmon, and LCR coho salmon; Permit 1487 authorized take of LCR Chinook salmon, LCR steelhead, CR chum salmon, and LCR coho salmon; Permit 1461 authorized take of SR fall Chinook salmon, SR spring/summer Chinook salmon, UCR spring Chinook salmon, UWR Chinook salmon, LCR Chinook salmon, SR steelhead, UCR steelhead, UWR steelhead, LCR steelhead, MCR steelhead, CR chum salmon, SR sockeye salmon, LCR coho salmon. The CRFPO is the permit holder on all the permits above with the exception of Permit 1461 for which the USGS is the permit holder and the CRFPO is an investigator.

2. Mortality Events: The following mortalities were incurred under Permit 1338 during the last five years:
2003—1,141 juvenile CR chum salmon, 23 juvenile LCR coho salmon (all unintentional mortalities in fyke trap);
2004—363 juvenile CR chum salmon, 2 juvenile LCR Chinook salmon, 26 juvenile LCR coho salmon (all unintentional mortalities in fyke trap);

2005—219 juvenile CR chum salmon, 2 juvenile LCR Chinook salmon, 17 juvenile LCR coho salmon (all unintentional mortalities in fyke trap);
2006—83 juvenile CR chum salmon, 1 juvenile LCR Chinook salmon, 27 juvenile LCR coho salmon (all unintentional mortalities in fyke trap).
The following mortalities were incurred under Permit 1461:
2007—3 juvenile LCR Chinook salmon, 1 juvenile CR chum salmon, 4 juvenile LCR coho salmon.

Unintentional mortalities that occurred under Permit 1338 were primarily due to relatively high abundance of fish and debris load collected in the livebox of two fyke traps. Promptly removing fish from the livebox and thoroughly cleaning debris on a daily basis was effective in minimizing unintentional mortalities and keeping them well below the levels allowed under Permit 1338. Unintentional mortalities that occurred under Permit 1461 were primarily due to marking and MS-222 use.

L. Certification:

I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA.

Timothy W. Roth — Signature

5/27/08 — Date

Timothy W. Roth, Acting Project Leader CRFPO
Name and Position Title

References

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Table 1.

ESU/ Species	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
LCR Chinook Salmon	Juvenile	Naturally Produced	Capture, Handle, Release	4,800	48/4,800	Cedar Creek, Clark Co., WA	January - December
CR Chum Salmon	Juvenile	Naturally Produced	Capture, Handle, Release	120	1/120	Cedar Creek, Clark Co., WA	January - December
LCR Steelhead	Juvenile	Naturally Produced	Capture, Handle, Release	800	8/800	Cedar Creek, Clark Co., WA	January - December
LCR Coho Salmon	Juvenile	Naturally Produced	Capture, Handle, Release	22,500	225/22,500	Cedar Creek, Clark Co., WA	January - December
LCR Coho Salmon	Juvenile	Artificially Produced	Capture, Handle, Release	7,500	75/7,500	Cedar Creek, Clark Co., WA	January - December
LCR Coho Salmon	Adult	Naturally Produced	Capture, Handle, Release	75	1/75	Cedar Creek, Clark Co., WA	January - December
LCR Coho Salmon	Adult	Artificially Produced	Capture, Handle, Release	25	0/25	Cedar Creek, Clark Co., WA	January - December

Resumes

Name: Howard Schaller
Present Position: U.S. Fish and Wildlife Service, Columbia River Fisheries Program Office
Education and Training:

Degree	Date	School
B.S. Biology	1975	York College
M.S. Marine Science	1980	Long Island University
Ph.D Oceanography	1984	Old Dominion University

Relevant Experience:

1999-present I Supervise the activities of this Fisheries Resource Office, which is responsible for the Service's stock assessment of Columbia River fish and aquatic species. I oversee a Conservation Assessment team, Natural Production team, Harvest and Hatchery Assessment team, and a Columbia River Hydrosystem Coordination team. I provide technical guidance to our staff in the areas of: fish stock assessment; population recovery and viability assessment; bull trout recovery planning and design of a monitoring and evaluation plans; Columbia Basin water management; evaluation of habitat restoration projects; and ecosystem evaluations.

1990-1999 Biometrics Program Leader in the Interjurisdictional Fisheries Management Program for the Oregon Department of Fish and Wildlife (ODFW), Portland, Oregon. 2501 SW 1st Avenue, Portland, Oregon 97207

1984-1990 Senior Fisheries Scientist for the Columbia River Inter-Tribal Fish Commission (CRITFC), Portland, Oregon.

1982-1984 Co-principal investigator for the Prince William Sound (PWS) Salmon Management Study. Department of Oceanography, Old Dominion University, Norfolk, Virginia.

1981-1982 Research Assistant for the lower Yukon Chinook Management Study. Department of Oceanography, Old Dominion University, Norfolk, Virginia.

Selected Reports and Publications:

Al-Chokhachy, R., P. Budy, and H. Schaller. 2005. Understanding the significance of redd counts: a comparison between two methods for estimating the abundance of and monitoring bull trout populations. North American Journal of Fisheries Management 25:1505-1512.

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Name: Tim Whitesel

Present Position: U.S. Fish and Wildlife Service, Columbia River Fisheries Program Office

Education and Training:

Degree	Date	School
B.S. Biology	1983	SUNY College at Fredonia
B.A. Philosophy	1985	SUNY College at Fredonia
M.S. Zoology	1987	University of Rhode Island
Ph.D Biological Sciences	1990	University of Rhode Island

Relevant Experience:

2001-present Supervisory Fishery Biometrician, USFWS, Columbia River Fisheries Program Office: Responsible for oversight of the Conservation Assessment Team which provides technical guidance to ESA and Recovery issues in the Columbia River Basin. Member of the Willamette/Lower Columbia Technical Recovery Team (NOAA) and the Bull Trout Recovery Monitoring and Evaluation Group (FWS). Responsible for oversight of the Habitat and Natural Productions Teams which conducts basic research to assess bull trout, cutthroat trout, redband trout, Pacific lamprey, Western Brook lamprey, chum salmon and fall Chinook salmon populations.

2000-2001 Native Trout Program Leader, ODFW: Responsible for native trout studies on the habitat and population biology of westslope cutthroat trout, bull trout, and redband trout in the state or Oregon.

1999-2000 Endangered Species Act Coordinator – Fish, ODFW: Responsible for overseeing and coordinating all ESA activities for Fish Division.

1991-1999	Supervisory Fish and Wildlife Biologist, ODFW: Responsible for design, implementation and oversight of investigations on hatchery supplementation programs in NE Oregon. These investigations focused on Chinook salmon and steelhead trout.
1991	Postdoctoral Research Associate, Rutgers University: Responsible for investigations on metamorphosis in winter flounder and american eels.
1990	Postdoctoral Research Associate, University of Rhode Island, Graduate School of Oceanography: Responsible for a project on the effects of electrofishing on brook trout embryos.

Selected Reports and Publications:

McGree, M., T.A. Whitesel and J. Stone. In Preparation. The stages and timing of metamorphosis in Pacific lamprey, Lampetra tridentata. N. Amer. J. Fish. Mgmt.

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